



Rural Water Note

RWN 03

Maintaining Roaded Catchments □ September 2007

An often-overlooked issue in water management is the maintenance of structures used to harvest water. The condition of these structures, particularly roaded catchments, can dramatically affect the overall efficiency and reliability of on-farm water supplies.

In dry seasons, rainfall that does occur may not be heavy enough or of sufficient length to produce run-off into farm dams from natural or farmland catchments.

Paddocks and grade banks may provide run off water either after a big rain or after the soils in the paddock have wetted up. Grade banks, while more effective than farmland, do not do the same job as roaded catchments.

An increase in the runoff threshold (the rainfall intensity required for the catchment to run) above the intended design reduces reliability of the water supply; in below average rainfall years this will be critical.

A well-constructed, well-maintained roaded catchment surveyed on the correct grade and constructed in suitable soil types has a run-off threshold of around 10 to 12 mm/hour. These catchments can begin to shed water after only 4-6mm of total rainfall.

However, roaded catchments need regular maintenance to ensure that they perform at optimum levels (Fig 1). A poorly maintained catchment may have a rainfall threshold of around 15mm/hour to produce run-off. This reduces the likelihood of filling the dam or at least having some water channelled into the system during light rains.

Roaded catchments work by increasing run-off from the improved area in three ways:

- increasing the gradient of the surface (slope)
- decreasing surface detention (smooth, even surface)
- reducing the permeability of that sloping surface (infiltration).



Figure 1. A poorly maintained roaded catchment with weed growth evident, and erosion leading to deposition of silt at the collecting end.

Deterioration factors

Weed growth, soil erosion and damage by stock (if unfenced) will contribute greatly to the deterioration of a roaded catchment.

Weed growth can significantly reduce run-off from a roaded catchment by breaking up the surface seal and increasing infiltration.

Soil erosion on roaded catchments can occur by rilling of the side-slopes or gullying in the V-drains and collecting channels. Catchment efficiency is reduced and eroded material is washed into





the dam causing sedimentation and reducing its effective storage capacity. Even where soil erosion is not initially an issue, it can be exacerbated when combined with other aspects of poor maintenance.

Livestock will damage the compacted and rolled catchment surface, while stock manure and stock camps on catchments encourage weed growth, cause bacterial and organic pollution and promote algal growth in dams.

Roaded catchments require ongoing maintenance or reconstruction to:

- restore the catchment surface
- control soil erosion
- control weed growth
- improve run-off efficiency.

Weed control

Most weed growth on roaded catchments can be controlled readily and conveniently by herbicides.

Knockdown herbicides can be used to kill growing weeds. Residual herbicides can be used before weed germination and will give variable periods of residual control, depending on the herbicide and its application rate. Compatible knockdown and residual herbicides will give the benefits of both.

However, residual herbicides can wash off compacted clay surfaces and contaminate the runoff water stored in farm dams. Chemical choices are very limited if crustaceans or fish are present in dams. It is undesirable to use water for human consumption and kitchen use from dams that collect runoff from herbicide-treated roaded catchments.

Scraping the surface of roaded catchments with a road grader to remove the weeds is not normally recommended due to the soil disturbance that can result. Scraping may be useful where contamination of the run-off with herbicides is not acceptable. Rolling is required after scraping to re-seal the catchment surface.

Restoring the catchment surface

Removing accumulated sediment that increases run-off thresholds can restore the surface of a catchment provided suitable soils were used in its initial construction. In areas where soils are not of sufficient depth or are of different quality or texture, reconstruction or surface maintenance may cause the catchment to leak where these soils are exposed.

Compaction and smoothing of the catchment surface by rolling during reconstruction will greatly improve its performance and durability, particularly if the soil contains sufficient moisture. Farm tractors can be used for compaction, but are not as good as machinery designed for the job.

Further information

Roaded Catchments to Improve the Reliability of Farm Dams. (2005), Bulletin 4660, Department of Agriculture and Food, Western Australia.

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